Bangalore Electricity Supply Company Limited

(Wholly owned by Government of Karnataka Undertaking)

TECHNICAL SPECIFICATION FOR CHAIN PULLEY of 2 Ton Capacity

1.0 SCOPE:

This specification provides for manufacture, testing before dispatch, supply and delivery of Hand Operated Chain Pulley Block as per IS 3832:2005 and its amendments thereon.

2.0 SPECIFICATION REQUIREMENT:

The chain block shall generally conform to IS: 3832-2005 and in addition to the requirements given in this standard.

3.0 MATERIALS OF CONSTRUCTIONS:

3.1 **FRAME**

The frame shall be fabricated of steel conforming to IS: 226-1975 'Specification for structural steel and its amendments thereon. IS: 961-1975 'Specification for structural steel (high tensile).

3.2 **GEARS**

The gears used in the block shall be of proper strength and surface durability High carbon steel conforming to 5 of IS:1875-1978 'Specification for carbon steel billets, blooms, slabs and bars for forgings (fourth revision)' or alloy steel conforming to IS:4367-1991 'Specification for alloy steel forgings for general industrial use' or case hardening steel conforming to IS:4432-1988 'Specification for case hardening steels' shall be used. The minimum hardness shall be 200 HB (Brinnel Hardness).

3.3 **BRAKE**

All the chain blocks shall be provided with an automatic all weather mechanical load brake which shall prevent self-lowering of the load in all working positions. The load brakes shall also allow smooth lowering of load without harmful overheating of the block.

3.4 **PAWL**

The pawl shall be made of steel, hardened and tempered. The hardness of the tip shall not be less than 40 HRC and that of the ratchet not less than 30 HRC.

3.5 **BEARINGS**

The load wheel shall be mounted on two-friction bearings for smooth operation. The intermediate pinion bearings shall be either plain or anti-friction type. The plain bearing, when ever used, shall be suitably locked by a locating pin to prevent its rotation.

3.6 **HOOKS**

The hooks shall be made of high tensile steel conforming to Grade 3 of IS:1875-1978 and shall be of standard trapezoidal section conforming to IS: 8610-1977 'Specification for point hook with shank capacity upto 5 tones trapezoidal section (with amendment No.1)'.

a) The bottom hook shall be so designed that it shall be free to swivel in the loaded condition without twisting the load chain. The top hook shall be so designed that it can swivel under no load condition. The bottom hook shall rotate on ball thrust bearing housed in cross head.

b) The top hook shall be mounted in a cross head, which shall be free to adjust itself in the direction of pull.

c) The suspension fittings other than hooks shall be of sufficient strength to afford a static factor of safety of not less than 4.

3.7 **LOAD CHAIN**

a) Load chain shall be electrically welded and accurately calibrated. It shall conform to at least grade 40 of IS:3109 (Part 2)-1982 'Specification for short link chain, Grade M(4), Part 1 Non-Calibrated load chain for lifting purposes (second revision)'. But chain made of grade 80 of IS:6216-1982 'Specification for short link chain, Grade T(8) calibrated for pulley blocks and other lifting appliances (first revision)' is preferred.

b) Every chain block shall be provided with load chain normally of 3 lift capacity. Extra lift, if required, shall be so specified while ordering.

3.8 **LOAD CHAIN WHEEL**

The load chain wheel shall be made of malleable cast iron conforming to IS:2108-1977 'Specification for blackheart malleable iron castings alloy steel or any other suitable material.

3.9 **HAND CHAIN**

a) Hand chain shall be of 6.3 mm nominal size and shall conform to IS:2429 (Part 2)-1970 'Specification for round steel short link chain (electric but welded), grade 30: Part 2 Calibrated load chain for pulley blocks and other lifting appliances (second revision)'.

b) The length of the hand chain shall be specified in Purchase Order. It shall be such that the lowest point of the suspended loop shall hang about 0.4 meter above the operating level.

3.10 **HAND CHAIN WHEEL**

Hand chain wheel shall be provided with flanges ad designed to ensure effective operation with and chain. It shall be made of SG iron or Blackheart Malleable Iron as per IS:2108-1977.

3.11 **HAND CHAIN GUIDE**

The hand chain guide shall be so designed that the chain will not come out of the sheave during use.

4.0 OTHER COMPONENTS

All the other components like guide, stripper, idler wheels, anchorage, etc, shall Conform to IS:3832-1986.

5.0 DIMENSIONS

The main dimensions of the chain blocks shall be as given in Table 1 read with Fig. & Table 2 Fig

6.0 LUBRICATIONS

Adequate lubricating arrangement shall be provided for all the bearings, gears And hook blocks.

7.0 TESTING AND INSPECTION

Inspection and testing of the chain blocks shall be carried out as specified in IS:3832-2005.

7.1 ENDURANCE TYPE TEST

A sample block shall be loaded with the WLL which shall be raised and lowered so that the mechanism is in motion for 100 h at an equivalent minimum hand chain speed 20 m/min in 500 mm to 600 mm steps.

There shall be no breakage of material, partial or complete, nor such distortion as could result in the release of the load.

7.2 DESIGN TEST

At the purchaser's option and expense a sample block or blocks shall be selected by the representative of the purchaser and shall be subjected by a tensile testing machine, to at least four times the working load limit capable to withstand for at least 5 rein, without breakage of material, partial or complete or such distortion as could result in the release of the load. Following this test all parts shall be defaced to make them unusable.

7.3 OPERATIONAL PROOF TEST

Each chain pulley block shall be subjected by the manufacturer to a proof load of 1.5 times the working load limit through a length of lift which will ensure that every part of the block mechanism and each tooth of the gears come under load. When the test is carried out by operating the hand chain wheel by power, the load shall also be lifted and lowered by hand through a distance sufficient to prove the satisfactory working of the mechanism of the block.

After operational proof test, the block shall be examined by a competent person. It complies with this standard only if it is found free from deformation, cracks, flaws or other defects.

7.4 LIGHT LOAD TEST

Each block shall be loaded with a test weight of between 25 percent and 50 percent of working load limit (WLL) which shall be raised and lowered through a height of between 250 mm and 500 mm.

When the hand chain is released at any point during raising and lowering, the brake shall hold the weight otherwise it shall be rejected.

7.5 INSPECTION

The supplier shall intimate the BESCOM 15 days in advance to acceptance test before dispatch from the factory to wit representative shall inspect the have access to the works of the manufacturer at all reasonable times for the purpose of witnessing the specified test and inspecting the test equipment and methods of examination.

7.6 CERTIFICATE OF TEST AND EXAMINATION

A certificate of test and examination shall be issued with every consignment of blocks, giving the following information for each one:

a) Safe working load,
b) Distinguishing mark,
c) Description,
d) Range of lift,
e) Load chain size and grade,
f) Number tested, and
g) Operational proof load applied.

8.0 DESIGNATION

A triple spur chain pulley block having a lifting capacity of 2 tones and conforming to this standard shall be designated as Table-1 Fig & Table-2 Fig.

9.0 MARKING

A name-plate shall be fixed to the block at easily visible location and shall be Legibly and indelibly printed as mentioned below:

- Safe working load
- Range of life
- Size of load chain
- Manufacturers name and trade mark
- P.O.No & Date
- ISI Mark & No.
- BESCOM Property

10.0 DESPATCH:

The Supplier shall commence only after the sample is approved. Further the manual containing operation, maintenance of the equipment/components shall be supplied along with packing.

11.0 PACKING & FORWARDING:

The equipment shall be packed suitably. The supplier is responsible for any damage to the equipment due to improper and inadequate packing. The contractor without any extra cost shall supply any material found short without any extra cost.

GENERAL REQUIREMENTS FOR 2 TON CHAIN BLOCK

Sl.No		Description	BESCOM SPECIFICATION
1)	**Chain pulley details**		
	1.	Model	Spark Proof
	2.	Type	Hand Operated chain pulley block
	3.	Capacity	2Ton
	4.	No of falls	4 Nos
	5.	Lift	Minimum 10 Meter
	6.	Design	IS: 3832 (2005) or better and latest IS standards.
	7.	Duty Class as per IS:3882	Class-II
	8.	Condition of service	Hydrocarbon Atmosphere
2)	**Hoisting Mechanism**		
		Type	Manual Hand Operated gear transmission
3)	**Load Chain**		
	1.	Type:	Link Type
	2.	Material	Alloy Steel Gr. 80 as per IS:6216 / IS:3109
	3.	Conforms to (Std./Code)	IS: 6216/3109
4)	**Hand Chain**		
	1.	Type:	Link Type
	2.	Material	Mild Steel Gr. 30 as per IS:2426 Part I
5)	**Load Hook & Hook Block**		
	1.	Type: Of load hook	'C' Type Min C30 coller shank type fitted with safety latch
	2.	Load Hook conforms to (Std./Code)	IS: 15560
	3.	Type of Hook suspension	Swiveling
	4.	Type of bearing	Thrust ball bearing of hook suspension
5)		**Gear / Pinion**	
	1.	Type:	Spur / Helical
	2.	Material	16MnCr5 Hardened
	3.	Type of bearing	Antifriction ball bearing / Roller
	4.	Guide Wheel	PB4/HTB2
	5.	Ratchet Wheel	PB4
	6.	Hand Chain wheel	PB4/HTB2
	7.	Load Chain wheel	PB4/HTB2

	8.	Hand Chain Wheel Guide	Brass Strip Brazed on M.S.
	9.	Sprockets	
		1. Type of bearing	Antifriction ball bearing / Roller
	10.	Brakes	
		1) Type	Automatic Mechanical load brake to prevent self-lowering the load & Ratchet / Pawl arrangement
		2) Material	Brake Disc Abestos Free Moulded Friction Free

12.0 Materials of Constructions

Specific Note:

1) Ball and Roller anti frication bearing only will be used.
2) Swiveling type standard shank hook mounted on grease lubricated anti-frication thrust bearing will be used.
3) Load chain & operating chain will be of calibrated type.
4) Pulley used for operating mechanism will have suitable guards to prevents chain from coming out.
5) All the open gearing will have suitable cover.
6) Minimum diameter of pulling chains will be 6 mm. All open gearing etc. will be suitable cover.

Sd/-
General Manager (El.)
Quality Standards and Safety,
BESCOM

TABLE-1

TABLE 1

MAIN DIMENSIONS OF THE CHAIN BLOCK
(Read this along with Figure 1)

Capacity in tonnes (*Tested to tonnes*)	0.5 (*0.75*)	1.0 (*1.5*)	2.0 (*3.0*)	3.0 (*4.5*)	5.0 (*7.5*)	10.0 (*15.0*)
A(Max), mm	415	515	575	755	945	1320
B(Max), mm	210	255	340	385	455	610
C(Max), mm	185	200	245	215	245	255
No. of falls of chain on which the load is lifted	1	1	1-2	1-2	2-3	3-4
Appx.. Max Mass* (Kg) with 3m lift	22	30	56	68	120	200

* Considerably lower masses are permissible with better material of construction.

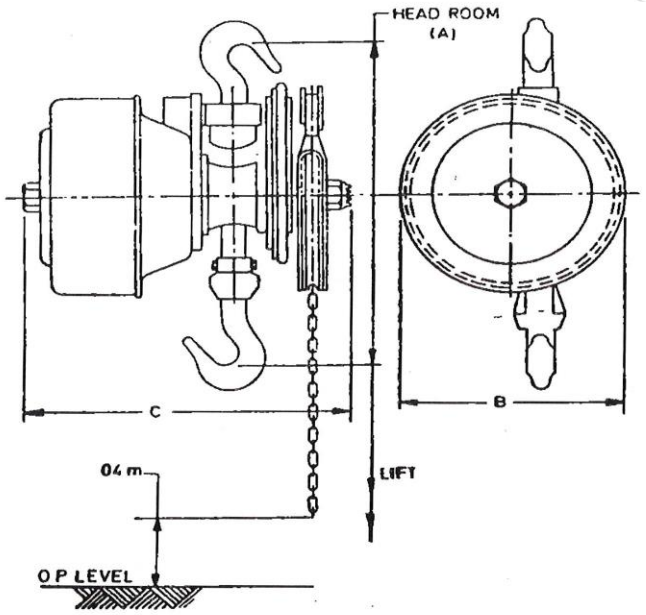

FIG. 1 HAND OPERATED CHIAN PULLEY BLOCK

TABLE -2 Fig-2

TABLE-2

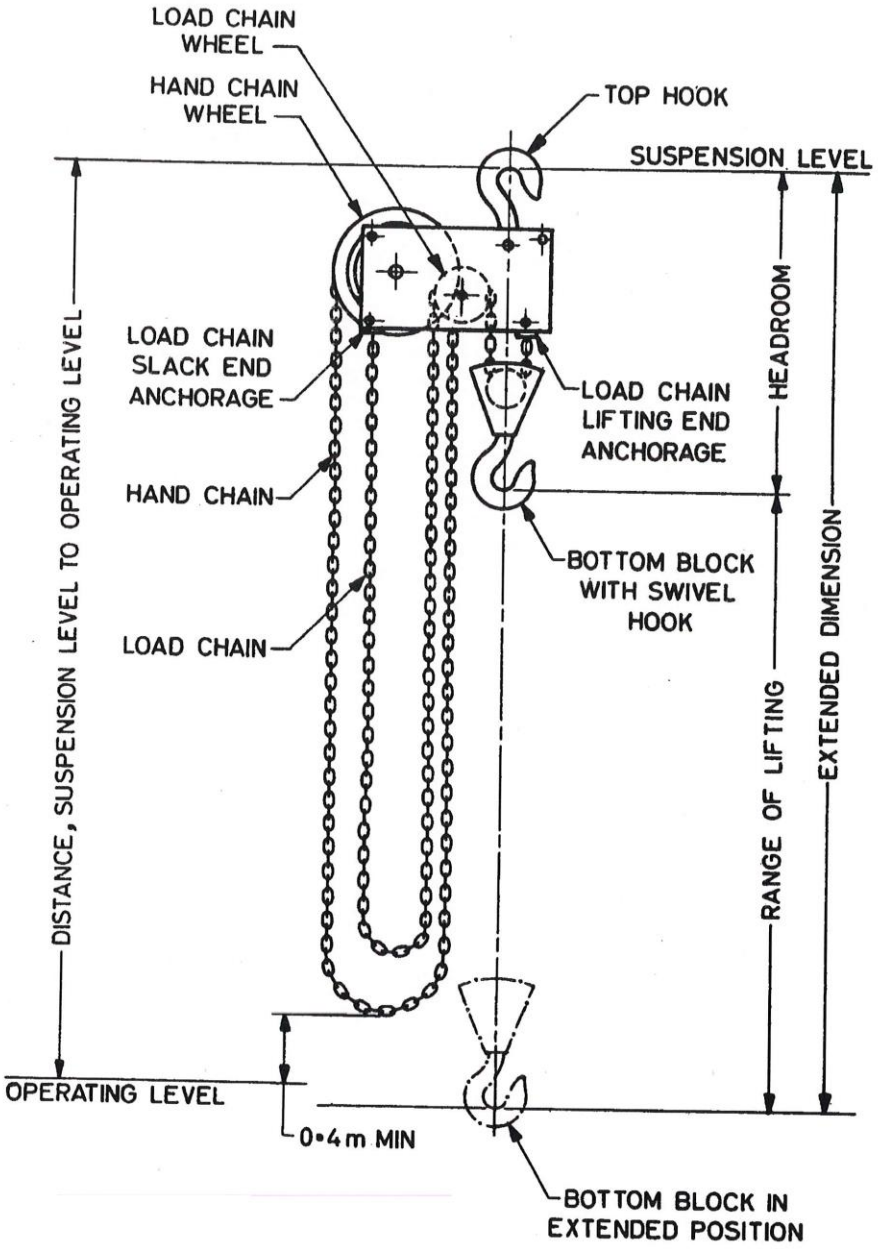

FIG. 1 CHAIN PULLEY BLOCK